

Date: Thursday, 04/01/2007 11:07:12 AM
User: Linda Lacelle

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services		Drawing Name	: BAR
Job Number	: 30146			
Estimate Number	: 10386			
P.O. Number	: N/A		Part Number	: D31961
This Issue	: 04/01/2007 S.O. No. : N/A		Drawing Number	: D3196 UNDER REVIEW <i>OK</i>
Prsht Rev.	: NC		Project Number	: N/A
First Issue	: N/A		Drawing Revision	: U/R
Previous Run	: 29120		Material	: N/A
Written By			Due Date	: 20/01/2007
Checked & Approved By			Qty:	10
Comment	: Est Rev: A New Issue 05-11-08 JLM		Um:	Each
Additional Product				
Job Number: 				
Seq. #:	Machine Or Operation:	Description :		
1.0	M6061T6B0750X01500	6061-T6 Bar .75" X 1.5"		
				
Comment: Qty.: 2.2922 f(s)/Unit Total: 22.9215 f(s) Material: 6061-T6/T651 (QQ-A-200/8) or (QQ-A-225/8) (M6061T6B0.750x01.500) M102508 (1 5/8") Identify for D3196-1 M18571 (1 4/8") * about 30" left, 26 1/4" cut rest sub Batch: M103156 SD 07.01.18				
2.0	BAND SAW	BAND SAW		
				
Comment: BAND SAW Cut blank: (0.75" x 1.50") x 26.200" long Bar SD / 07.01.18 10				
3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1		
				
Comment: HAAS CNC VERTICAL MACHINING #1 1-Machine D3196-1 as per Folio FA339 and Dwg D3196 Identify as D3196-1 2-Deburr ER 07.01.19 (X10)				
4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE		
				
Comment: INSPECT PARTS AS THEY COME OFF MACHINE ER 07.01.19 (X10)				
5.0	QC8	SECOND CHECK		
				
Comment: SECOND CHECK J.F. 07/01/19 X/10				

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			
07/01/18	42	are part scrap? Program wasn't changed for the second opp AND Dim. 1.102 is uncorrected on one part by 0.012" and	QSI 042 CP 07/01/18 per QSI 042	Program was changed by SLM. Scraped by good replace. 3.495 dim OK at 3.503 ^{+0.010} STRESS OK BECAUSE THIS WAS	U 07/01/19	07/01/18	QSI 042 07/01/18	07/01/18
07/01/19	3	width by .005". Width of "ped" at holes is 0.97 instead of 1.102".	QI 07/01/19 per QSI 042	KEEP SAME DIM AS REV B OF DWG. PART OK, MARGIN OF SAFETY OF STRESS REPORT UNAFFECTED.	U 07/01/19	07/01/23	QSI 042 07/01/19 per QSI 042	07/01/23

Part No: _____

PAR #: _____

Fault Category: _____

NCR: Yes

No

DQA: _____

Date: 07/01/18

NOTE: Date & initial all entries

QA: N/C Closed: _____

Date: _____

Date: Thursday, 04/01/2007 11:07:12 AM
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Drawing Name: BAR

Job Number: 30146

Part Number: D31961

Job Number:



Seq. #: Machine Or Operation:

Description :

6.0 HAND FINISHING1 HAND FINISHING RESOURCE #1



YL



(10)

Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

07/01/22

AM

07/01/19

(DX)

7.0 POWDER COATING POWDER COATING



M101601



Comment: POWDER COATING

Powder Coat Grey Sandtex (Ref: 4.3.5.6) as per QSI 005 4.3.

YL

07/01/22 X10

8.0 QC3 INSPECT POWDER COAT/CHEMICAL CONVERSION



YL 07/01/22



(10)

Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

9.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock
Location: _____

ST136

07/01/23

(10)

10.0 QC21 FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

07/01/23

Job Completion



YL 07/01/23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: _____

PAR #: _____

Fault Category: _____

NCR: Yes No DQA: _____

Date: _____

NOTE: Date & initial all entries

QA: N/C Closed: _____

Date: _____

DART AEROSPACE LTD	Work Order:	30146
Description: Bar	Part Number:	D3196-1
Inspection Dwg: D3196	Rev: B-C	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

X First Article Prototype

Measured by:	<u>SP</u>	Audited by:	<u>SD</u>	Prototype Approval:	N/A
Date:	07/01/18	Date:	07/01/18	Date:	N/A

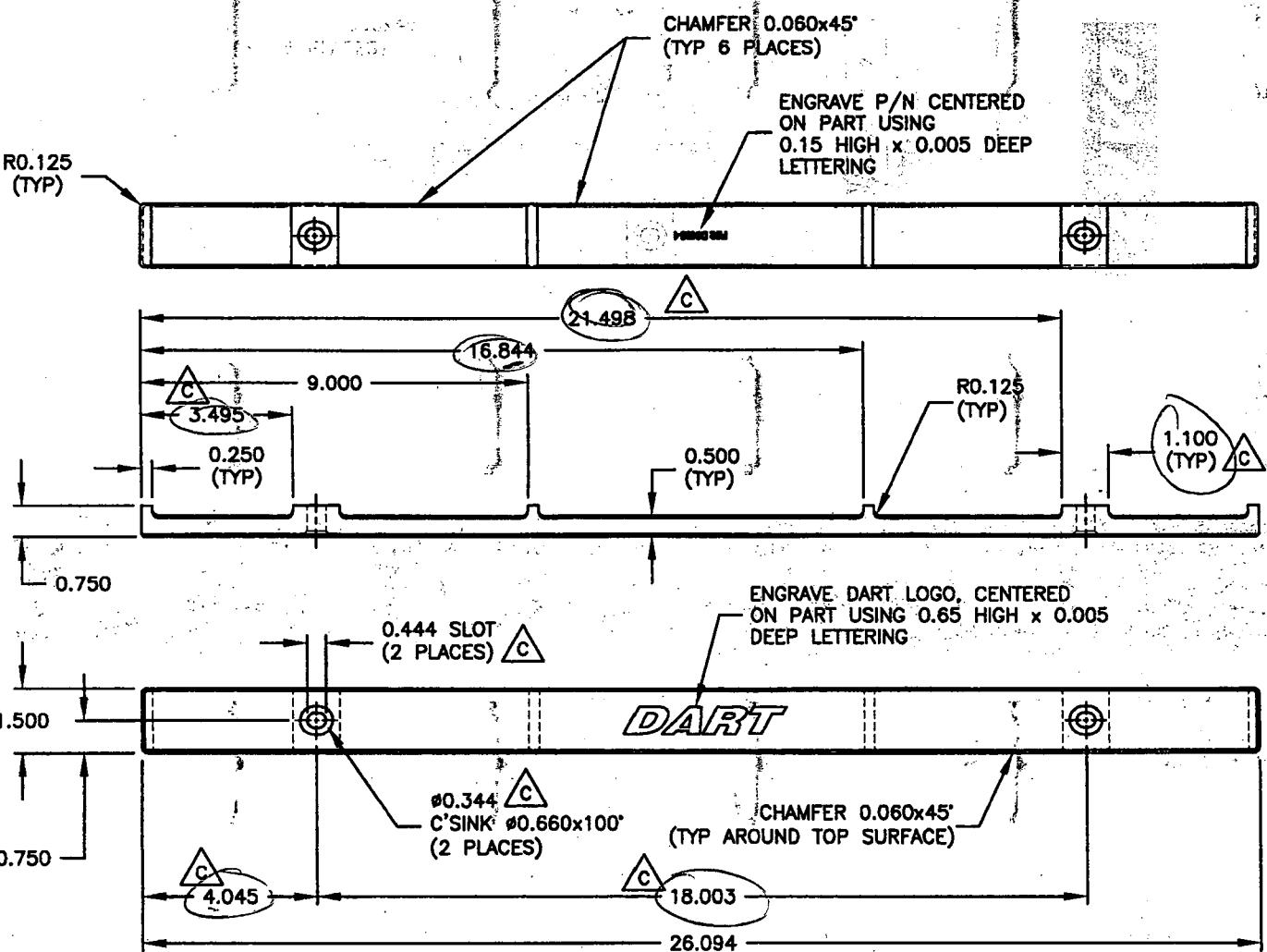
Rev	Date	Change	Revised by	Approved
A	04.04.20	New Issue	KJ/RF	J
B	06.10.24	Dwg Rev. updated	KJ/JLM	Z

W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE			By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector	
			Initial Design Mgr	Action Description Design Mgr	Sign & Date				

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries QA: N/C Closed: _____ Date: _____



D3196-1 BAR

- 1) MATERIAL: 6061-T6/T651 ALUMINUM (QQ-A-200/8 OR QQ-A-225/8)
(REF DART SPEC. M6061T6B)
 - 2) BREAK ALL SHARP EDGES 0.005 TO 0.010
 - 3) FINISH: ACID ETCH AND ALODINE PER DART QSI 005 4.1
POWDER COAT GREY SANTEX (4.3.5.6) PER DART QSI 005 4.3
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
ALL DIMENSIONS ARE IN INCHES

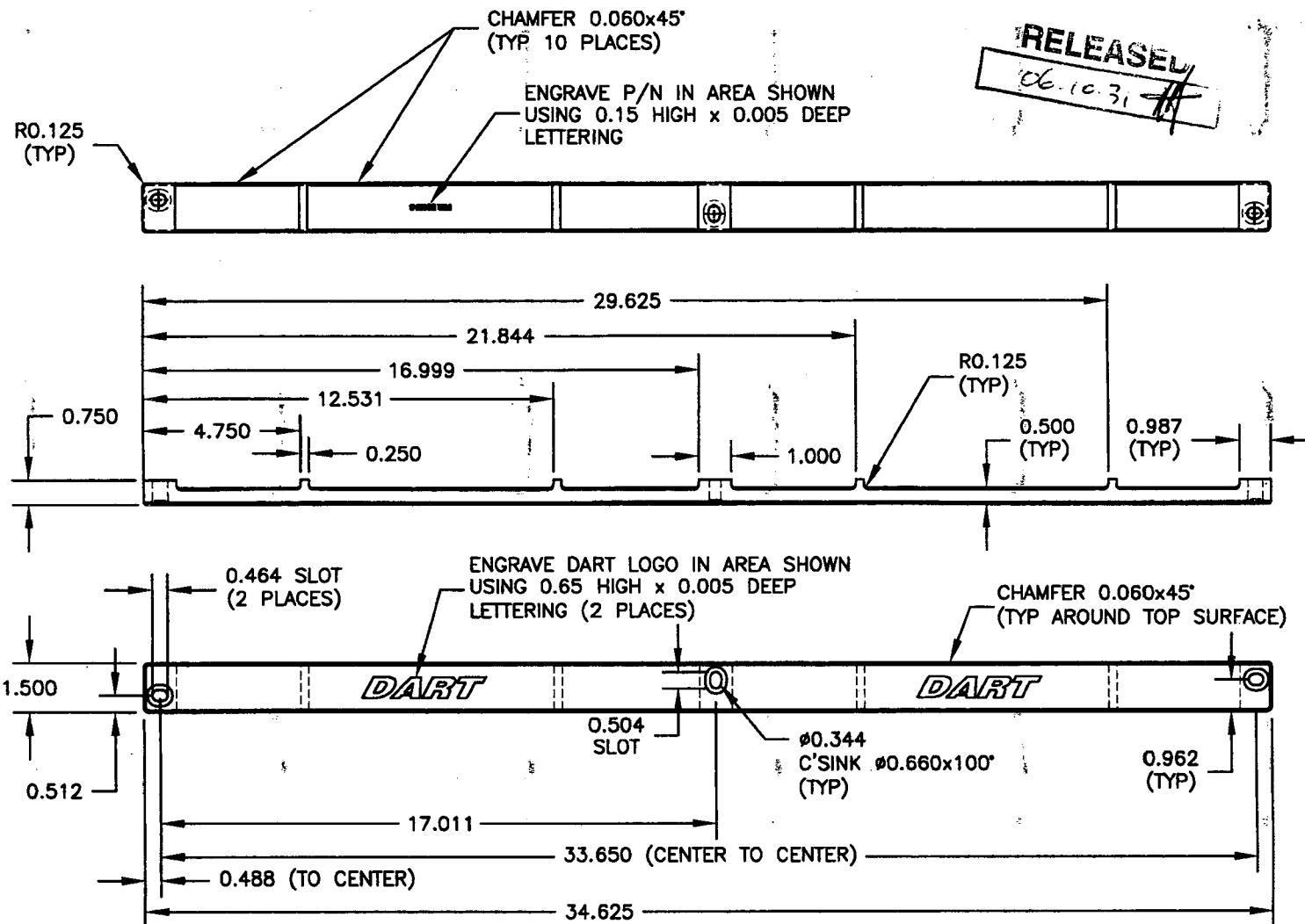
RELEASED

06.10.31

DART

DESIGN	DRAWN BY	DART AEROSPACE LTD		
DATE	APPROVED	HAWKESBURY, ONTARIO, CANADA		
REVISION	DRAWING NO.	REV. C		
DATE	TITLE	DATE	TITLE	SCALE
A	03.06.25	06.10.31	BAR	1:4
B	06.09.25		ADD D3196-5	
C	06.10.31		ADD SLOTS ON -1; REMOVED -5	

WJL 20/14/04

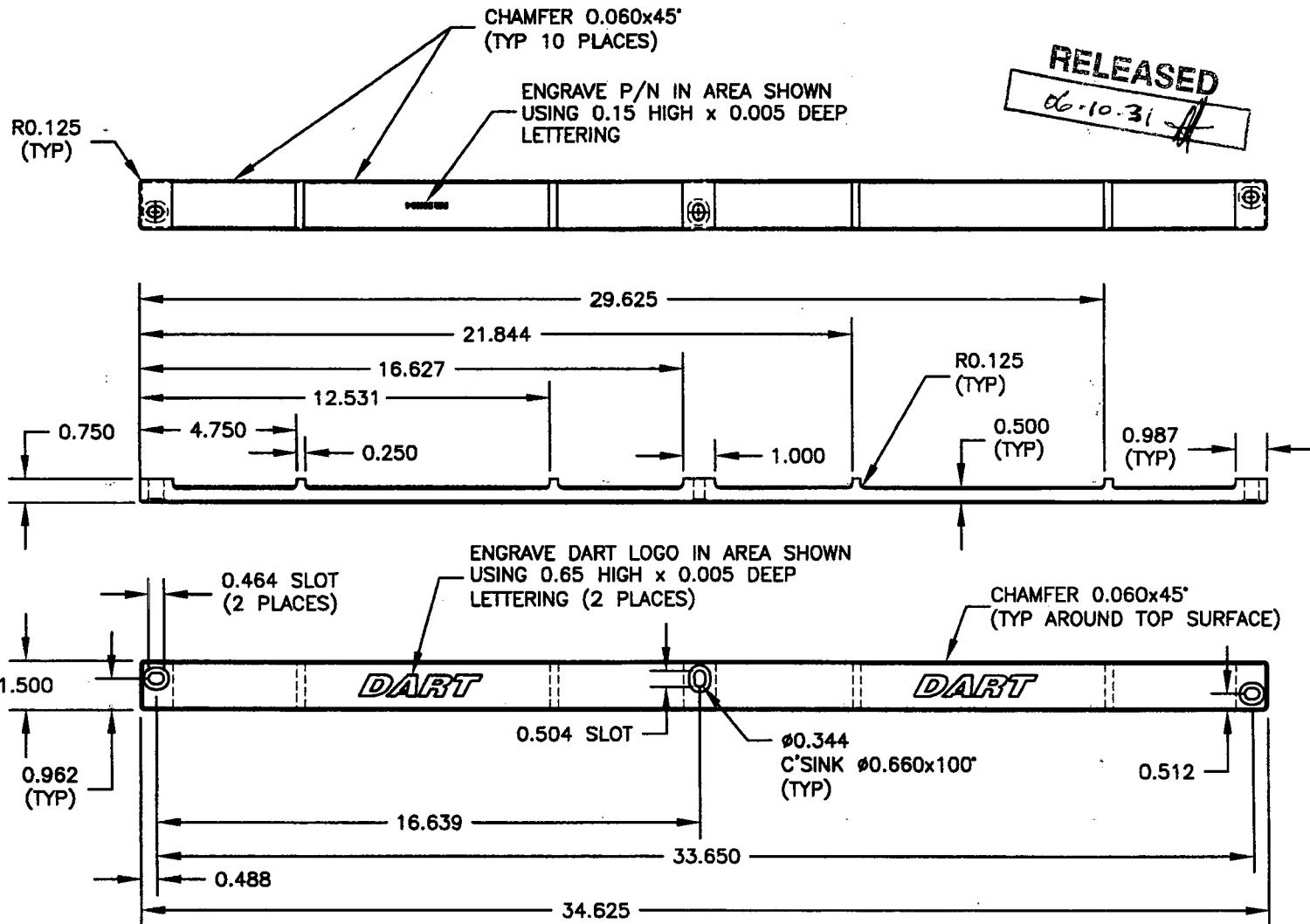


D3196-3 BAR

- 1) MATERIAL: 6061-T6/T651 ALUMINUM (QQ-A-200/8 OR QQ-A-225/8)
(REF DART SPEC. M6061T6B)
- 2) BREAK ALL SHARP EDGES 0.005 TO 0.010
- 3) FINISH: ACID ETCH AND ALODINE PER DART QSI 005 4.1
POWDER COAT GREY SANDEX (4.3.5.6) PER DART QSI 005 4.3
- 4) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 5) ALL DIMENSIONS ARE IN INCHES

DART

DESIGN	DRAWN BY	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO.
DATE		REV. C
90	RH	D3196
06.10.31		SHEET 2 OF 3
		SCALE 1:5



D3196-4 BAR

- 1) MATERIAL: 6061-T6/T651 ALUMINUM (QQ-A-200/8 OR QQ-A-225/8)
(REF DART SPEC. M6061T6B)
- 2) BREAK ALL SHARP EDGES 0.005 TO 0.010
- 3) FINISH: ACID ETCH AND ALODINE PER DART QSI 005 4.1
POWDER COAT GREY SANTEX (4.3.5.6) PER DART QSI 005 4.3
- 4) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 5) ALL DIMENSIONS ARE IN INCHES

DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO.
DATE		TITLE
97	JL	D3196
06.10.31	TH	BAR
		REV. C
		SHEET 3 OF 3
		SCALE 1:5

4.0 Analysis4.1 D3196-1/-3/-4 Bar Analysis4.1.1 D3196-1 Bar Bending Failure

The loading of the D3196-1 Bar is shown in Figure 1 of Appendix B. The worst case loading is the 16 g forward acting load because the magnitude of the load is higher and the section is smaller in the fwd-aft direction (16g) than it is in the up-down direction (4g).

$$b := 1.50 \cdot \text{in}$$

$$t := 0.50 \cdot \text{in}$$

$$k := 1.5$$

$$M := 2048 \cdot \text{in} \cdot \text{lb}$$

$$I = \frac{1}{12} \cdot b \cdot t^3$$

$$F_{bul} := F_{tul} + F_{o1} \cdot (k - 1)$$

$$\mu_u := F_{bul} \cdot \frac{2 \cdot I}{t}$$

$$MS := \frac{\mu_u}{M} - 1$$

Width of Section in Bending

Thickness of Section in Bending

Shape Factor (Bruhn C3.3)

Maximum Ultimate Bending Moment

Inertia of cross section

Modulus of Rupture (Bruhn C3.11)

Allowable Bending Moment (Ultimate)

Margin of Safety (Ultimate)

*width of
pad has
no effect
on MS*

*P
07.01.19*

4.1.2 D3196-3/-4 Bar Bending Failure

The loading of the D3196-3/-4 Bar is shown in Figure 2 of Appendix B. The worst case loading is the 8g sideways acting load because the magnitude of the load is higher and the section is smaller in the lateral direction (8g) than it is in the up-down direction (4g).

$$b := 1.50 \cdot \text{in}$$

$$t := 0.375 \cdot \text{in}$$

$$k := 1.5$$

$$M := 1180 \cdot \text{in} \cdot \text{lb}$$

$$I = \frac{1}{12} \cdot b \cdot t^3$$

$$F_{bul} := F_{tul} + F_{o1} \cdot (k - 1)$$

$$\mu_u := F_{bul} \cdot \frac{2 \cdot I}{t}$$

$$MS := \frac{\mu_u}{M} - 1$$

Width of Section in Bending

Thickness of Section in Bending

Shape Factor (Bruhn C3.3)

Maximum Ultimate Bending Moment

Inertia of cross section

Modulus of Rupture (Bruhn C3.11)

Allowable Bending Moment (Ultimate)

Margin of Safety (Ultimate)